



# Neosho Mucket and Rabbitsfoot Mussels



Neosho mucket uses a minnow lure to attract a host fish (bass) for its larvae, credit Chris Barnhart/Missouri State University.



Rabbitsfoot uses a midge fly lure to attract a host fish (shiners) for its larvae, credit Chris Barnhart/Missouri State University.

*No other country in the world equals the United States in freshwater mussel variety. The U.S. has nearly 300 mussel species, while Europe has only 12 species. The Southeast is especially rich in aquatic biodiversity.*

Unfortunately, our mussels are in trouble. It's estimated that 70 percent of U.S. freshwater mussels are extinct, endangered, or in need of special protection. Many of their problems stem from how they live and the changes that have occurred to their river habitats.

## Why are freshwater mussels so imperiled?

Our native freshwater mussels face greater problems today than they did just a few years ago. Mussels are primarily threatened from changes to their habitat. Although water quality has improved in some areas, pollution, especially polluted rainwater runoff from roads and fields, is an ongoing threat to native mussels. Dirt and chemical contaminants in streams continue to take a serious toll. Habitat losses from channelization and sand and gravel mining are also problems.

## Life down under

Most freshwater mussels live burrowed in mixed mud, sand, and gravel at the bottom of rivers and streams. Some are adapted to the quiet water and muddy depths of lakes, ponds, and reservoirs.

Mussels usually do not move much, but a muscular "foot" helps them burrow and allows limited travel if disturbed by floods or drought. The foot also helps anchor them against strong currents and may prevent a hungry muskrat from tugging them out for its dinner. A mussel's shell, however, provides its main protection from predators.

Their hard, calcium-based shells consist of two halves joined by a hinge. Unique names like "rabbitsfoot," "Neosho mucket," "heelsplitter," and "fawnsfoot" refer to the wide range of shell size, color, shape, and texture.

## Freshwater Mussel Facts

*Common and scientific names:*

Neosho mucket (*Lampsilis rafinesqueana*)

Rabbitsfoot

(*Quadrula cylindrica cylindrica*)

**Status:** The Neosho mucket and rabbitsfoot were federally listed under the Endangered Species Act on September 17, 2013. The Neosho mucket is endangered and the rabbitsfoot is threatened. Both mussel species have been lost from more than 60 percent of their historical ranges.

**Description:** Mussels are bivalve mollusks, which means they have two valves (shells) surrounding a soft fleshy body. Freshwater mussels are related to snails, oysters, clams and squids.

**Habitat:** Rabbitsfoot mussels prefer shallow areas with sand and gravel along the bank and next to shoals, which provide a refuge in fast-moving rivers. They are found in 13 states from Pennsylvania to Oklahoma.

Neosho mucket mussels are also found in river bottoms with gravel and sand in shoals and near the shore. They are found in streams and rivers in Arkansas, Kansas, Missouri and Oklahoma.

**Diet:** Most animals must travel in search of food. But the food for these mussels — mainly tiny plants and animals called plankton suspended in the water — drifts to the mussels. By drawing water inside their shells through a siphon, their gills filter out food and take in oxygen.

**Life history:** Fertilized eggs develop and are released into the water to begin a parasitic stage. With little time to waste, these youngsters, called glochidia, must attach themselves to a host fish or perish. For some mussels, the host is limited to only a few fish species. Neosho mucket only uses black basses such as smallmouth, largemouth, and spotted bass for its host. Rabbitsfoot uses about a dozen species of shiners (minnows) for its host. This harmless parasitic stage lasts a matter of weeks before the larvae transform into young mussels and are ready to drop off the fish and begin a life on the stream bottom. Their life span is unknown, but a good estimate is 15 to 30 years.



### Critical habitat for the Neosho mucket and rabbitsfoot mussels

The Service has designated critical habitat for both mussel species. Critical habitat is a geographic area scientifically identified by the Service as necessary for the species to survive and reproduce. Designating critical habitat informs landowners and the public which specific areas are important to the species' conservation and recovery. In addition, federal agencies are required to consult with the Service on their actions that could impact critical habitat and together they work to avoid or minimize impacts through conservation measures. These measures would need to be carried out because the species are federally protected and listed, regardless of whether or not critical habitat is designated.

For the Neosho mucket, the Service designated critical habitat in seven stream segments where the mussel is found, comprising approximately 483 river miles in Arkansas, Kansas, Missouri and Oklahoma. For the rabbitsfoot, the Service designated critical habitat in 31 stream segments where the mussel is found, comprising approximately 1,437 river miles in Alabama, Arkansas, Indiana, Illinois, Kansas, Kentucky, Mississippi, Missouri, Ohio, Oklahoma, Pennsylvania, and Tennessee. The critical habitat is limited to the river itself, below the high watermark, and not the watersheds.

### Why should we care about mussels?

#### *Monitors of aquatic health*

The presence of diverse and reproducing populations of mussels indicate a healthy aquatic system which means good fishing, good water quality for waterfowl, other wildlife species, and people as well as assuring that our water is safe for our use (swimming and drinking). Conversely, when mussel populations are at risk, it indicates problems for other fish and wildlife species, and people, too.

#### *Ecological value*

Mussels are natural filters, feeding on algae and plankton that help clean the water. Mussels are also an important food source for many species of wildlife including otters, raccoon, muskrat, herons, egrets, and some fish.

#### *Education and aesthetic value*

The study of mussels, their natural history, and habitat requirements provides important lessons on the interconnectedness of the aquatic system and how species adapt to their ecosystem.



*Illinois River, Arkansas, is home to rabbitsfoot and Neosho mucket, credit Chris Davidson/USFWS*

### *Cultural value*

Mussels played an important role in the cultural history of prehistoric and recent native people. They were used as food and the shells were used for ornamentation, tools, and as a commodity for trade. Indian shell middens (the piles of shells that Native Americans left behind) extend for miles along sites of old villages and encampments along rivers. Mussels were used for buttons prior to World War II. They are still used in the cultured pearl industry.

### *Biodiversity*

Mussels play an important role in our aquatic ecosystems. Considering that less than 20 mussel species are found in most other countries of the world, our North American rivers and streams are truly "rich" with close to 300 species.

### What is being done?

There is still much more to learn about the biology and conservation issues facing mussels. Thanks to grants from the U.S. Fish and Wildlife Service and state wildlife agencies, researchers are now making new discoveries about the locations and abundance of rare mussel populations. This information, along with efforts to understand specific biological traits like identifying fish hosts, will allow for better conservation actions to ensure the continued survival of these rare and interesting animals.

### How can you help?

Individuals can do a number of things to help protect mussels including:

Conserve water to allow more water to remain in streams.

Use pesticides responsibly, especially around streams and lakes, to prevent runoff into mussel habitats. Consider using Integrated Pest Management strategies to reduce pesticide use.

Help control soil erosion by planting trees and plants to avoid runoff of sediments into freshwater areas.

Support practices for construction and maintenance of unpaved, rural dirt and gravel roads that minimize erosion and connectivity to our rivers and lakes.

Support and follow zebra mussel quarantine, inspection, and decontamination programs to prevent the spread of zebra mussels, an invasive species that competes with native mussels.

### Where can I find more information regarding the recovery efforts and critical habitat for the Neosho mucket and rabbitsfoot?

Additional information is available at:

[www.fws.gov/southeast/species/invertebrate/neosho\\_mucket.html](http://www.fws.gov/southeast/species/invertebrate/neosho_mucket.html)

and

[www.fws.gov/southeast/species/invertebrate/rabbitsfoot.html](http://www.fws.gov/southeast/species/invertebrate/rabbitsfoot.html)